

PROPERTY PLANNING COMMON ELEMENTS

COMPONENTS OF MASTER PLANS

HABITATS AND THEIR MANAGEMENT

Swamp Hardwoods

Description

This page describes management of swamp hardwoods, a forest type that occurs statewide, with southern and northern variants. Swamp hardwood is a deciduous forested wetland that occurs along lakes, streams, or in isolated lowland basins in poorly drained morainal landscapes. It is more common in northern Wisconsin than in the south. Silviculturally, a stand where any combination of black ash, green ash, red maple, silver maple, swamp white oak, or elms comprises 50% or more of the basal area is typed as swamp hardwood.

Black ash often is the dominant tree in the north, sometimes occurring in almost pure stands. Red maple, yellow birch, and American elm are important in some stands. Silver maple occurs occasionally, and red maple-silver maple hybrids are locally common in certain regions. Conifers such as northern white-cedar, tamarack, white spruce, black spruce, and balsam fir are sometimes present. Tall shrubs such as speckled alder, common winterberry, and mountain maple may be locally common. The herbaceous flora can be diverse and may include many species also found in alder thickets. Typical species are marsh-marigold, swamp raspberry, skullcap, orange jewelweed, and many sedges. Swamp hardwoods in the south are often dominated by red maple, green ash, and American elm, with black ash, silver maple, hybrids of red and silver maples, bitternut hickory, bur oak, swamp white oak, and basswood also occurring. Ferns, shrubs such as dogwoods, nannyberry, and alder, and vines such as poison ivy, Virginia creeper, and grapes can be prevalent in the understory. Undisturbed sites can host a rich spring flora. Microtopography is an important feature of swamp hardwoods, contributing to species and habitat diversity within stands.

Though related to bottomland hardwoods, swamp hardwoods are influenced by standing water (seasonally high water table or inundation during spring runoff or major precipitation events) rather than by flood waters that flow through the stand, a hydrologic difference that leads to growth rates and understory composition distinct from bottomland hardwoods. Some streamside tracts have characteristics that are intermediate between these two major forest types (e.g., dominated by swamp white oak and black ash). Natural disturbances in hardwood swamps include flooding, windthrow, drought, and sometimes fire (for stands located within a matrix of fire-influenced communities such as prairies or savannas). Of these, periodic inundation, typically occurring annually following snowmelt and spring rains, is the most important. This inundation is variable in extent, duration, and magnitude and influenced by local basin features, topography, soil type, and elevation with respect to the water table. The active scouring and deposition that characterizes bottomland hardwoods is less common and severe, or absent, in swamp hardwoods.

Swamp hardwoods historically were, and remain, much less common than bottomland hardwoods. They have suffered from drainage, ditching, siltation, excessive nutrient input, and overharvest. Isolated tracts occur nearly statewide. Northward and in the Central Sand Plains they often are associated with and grade into coniferous and mixed swamps.



Ecological Landscape Opportunities

Ecological Landscape	Opportunity*	
	Southern Type	Northern Type
Central Lake Michigan Coastal	P	I
Central Sand Hills		I
Central Sand Plains		I
Forest Transition		I
North Central Forest		M
Northeast Sands		I
Northern Highland		P
Northern Lake Michigan Coastal		I
Northwest Lowlands		P
Northwest Sands		I
Southeast Glacial Plains	I	I
Southern Lake Michigan Coastal	I	
Superior Coastal Plain		I
Western Coulee and Ridges		P

M = Major; major opportunity exists in this Landscape; many significant occurrences are recorded, or restorations likely to be successful.

I = Important; several occurrences important to maintaining the community in the state occur in this Landscape.

P = Present; community is present in the Landscape but better opportunity exists elsewhere.

Rare Species

Many Species of Greatest Conservation Need (SGCN) are associated with swamp hardwood forests throughout Wisconsin based on the findings in [Wisconsin's 2015 Wildlife Action Plan](#). To learn more, visit the [Southern Forest communities page](#) and click on "Southern Hardwood Swamp" and on the [Northern Forest communities page](#) and click on "Hardwood Swamp".

Threats

- Altered hydrology is a primary threat to swamp hardwoods. Beaver activity (although it can also be a beneficial disturbance) or improperly designed roads and culverts may lead to inundation and death of entire stands. Spring-fed sites are susceptible to rutting, soil compaction, and channeling of water when disturbed by construction activities or heavy equipment. Hydrology can also be disrupted by dams, ditching, and filling, resulting in severe habitat alteration.
- Heavy logging may result in "swamping", a raising of the water table due to reduced evapotranspiration, which can damage or kill any remaining trees and lead to lack of regeneration and replacement of the stand with wetland shrubs such as speckled alder, sedges, cattails, or reed canary grass.
- Many swamp hardwood stands in southern Wisconsin are small, isolated, and adversely affected by surrounding land uses that have destroyed or fragmented upland forests, led to inputs of excess nutrients or sedimentation, facilitated encroachment by invasive plants, and rendered the trees more susceptible to windthrow.



- Exotic diseases, insects, and plants are a significant and increasing threat to swamp hardwoods. Dutch elm disease has virtually eliminated American elm as a canopy dominant, altering stand structure. Emerald ash borer threatens the ash component and gypsy moth threatens oaks and other species. The exotic, highly invasive reed canary grass can spread rapidly after a disturbance that opens the canopy, such as timber harvest, windthrow, or disease, and quickly dominate the ground layer, impeding tree regeneration. Other problematic invasive plants are purple loosestrife, common and glossy buckthorns, and, potentially, *Phragmites* (common reed). The native but weedy box elder tree can spread following loss or removal of the canopy. Native shrubs such as prickly ash and gooseberry can become abundant in heavily grazed stands due to their low palatability to livestock.
- Excessive herbivory by white-tailed deer can impede tree regeneration.
- Swamp hardwoods lack age-class diversity. The very young and very old age classes are currently underrepresented.
- The increased probability of more extreme disturbance events associated with climate change, such as heavy downpours that lead to rapid, severe, more frequent midsummer flooding, may have negative consequences for swamp hardwoods. A decline in the duration of frozen-ground conditions may make forest management in this cover type more difficult.

Management Techniques

- Clearcut (progressive strip)
- Group selection
- Overstory removal
- Patch selection
- Shelterwood (strip)
- Single-tree selection
- Coppice (with standards)
- Site preparation
- Intermediate treatments
- Pesticide treatments

Management Considerations

- Carefully consider both landscape (watershed; surrounding land uses and vegetation; patch size, etc.) and site (hydrology; species composition; soils and topography; age structure, etc.) features when deciding on a management technique. A variety of management techniques may be applied depending on the management objectives, including both uneven-aged and even-aged systems. Use an adaptive management approach, and monitor results.
- Protect and maintain large and/or high-quality examples of swamp hardwoods, particularly when adjacent to other intact native habitats. Where possible, manage for larger stands, larger blocks, to increase connectivity with surrounding native habitats, and to soften sharp transitions between habitat types.
- Maintain or restore site hydrology whenever feasible.



- Where possible, use buffers to protect swamp hardwoods from negative impacts of surrounding land uses (e.g., sedimentation, pollution).
- Follow DNR Forestry management guidelines for emerald ash borer.
- Manage to maintain or increase tree species diversity as appropriate. In mixed conifer-hardwood stands, manage to increase the conifer component (white cedar, tamarack, hemlock, spruce, balsam fir). In hardwood stands, manage to maintain or increase silver maple, swamp white oak, yellow birch, hackberry, white birch, basswood, or red maple.
- In areas lacking conifers or other hardwoods, succession to lowland brush or sedge meadow may occur with the absence of ash. Any management strategy should focus on maintaining potential to reforest the site and preventing conversion to reed canary grass.
- Manage stands for composition and structural diversity by: retaining some large-diameter trees, living and dead cavity trees, snags, and coarse woody debris; creating canopy gaps of varying sizes; creating and maintaining a diversity of age and size classes; and applying extended rotation or managed old-growth management to some stands.
- Protect special features such as ephemeral ponds, seeps, riparian areas, and hummocks.
- Conduct timber harvests only under frozen-ground or very dry conditions to prevent rutting and soil damage and to protect site hydrology.
- Consider management for aesthetic and ecological values where this forest type occurs within important recreational corridors and riparian zones.
- Control and limit deer herbivory.

